to a maceration of the respiratory muscles, producing asphyxia

Wiedemann's Annalen der Physik und Chemie, No. 7.—On the specific heats of glasses of various compositions, by A. Winkelmann. The specific heats of the various constituents of different glasses were calculated or experimentally determined, and those of the glasses made up of them were calculated by Wöstyn's law, according to which a specific heat of a compound is obtained by adding together the products of the specific heats, the atomic weights, and the number of atoms of the elements contained in the compound, and dividing by the sum of the products of the atomic weights and numbers of atoms. On comparing the values thus calculated with those found by experiment, it was found that they agreed to within one per cent.—On a surface connected with the electric properties of tourmaline; thermodynamics of tourmaline and the mechanical theory of muscular contraction; and molecular theory of piezo-electric and pyro-electric phenomena, by E. Riecke. The author makes the attempt of formulating a thermodynamical theory of muscular contraction, and investigates its connection with the pyroelectric phenomena of tourmaline. He arrives at a formula in which the state of the muscle can be expressed by two variables only, the temperature and the tension.—Concerning the theory of electric oscillations in wires, by A. Elsas. The author shows that the Hertzian oscillations may be completely explained on the older electromagnetic theory, without reference to Maxwell's amplifications. He does not contend that Maxwell's theory is superfluous, but finds out how far the older theory is capable of proceeding without having recourse to Maxwell's conceptions.—Objective representation of Hertz's experiments, and the high tension accumulator, by L. Zehnder. A collection of practical hints for the performance of oscillation experiments by means of the 600-cell Planté accumulator.—Contributions to the theory of secondary batteries, by Franz Streintz. With comparatively low current densities, the resistance during discharge attains a maximum. As the current increases, the resistance slowly falls to a value equal to that in open circuit, and falls still further at higher current strengths.—On the determination of the length of a solenoid, by F. Himstedt. Contrary to Heydweiler's opinion, the length and radius of a solenoid as determined by its electromagnetic effect are not appreciably different from their geometrically calculated values.

IN the *Botanical Gazette* for June Mr. R. H. True has a paper on the development of the caryopsis, which supports the ordinary view respecting the formation of the fruit in grasses. Prof. Atkinson continues his account of the biology of the organism which causes the tubercles on the roots of Leguminosæ.

IN the *Journal of Botany* for July, Mr. A. B. Rendle describes and figures a case of the production of tubers within a tuber in the potato. Yet two more "species" are added to the long list of British *Hieracia* by Messrs. E. F. and W. R. Linton, *H. enstales* and *orcadense.*

IN the *Nuovo Giornale Botanico Italiano* for July is a paper by Sig. E. Baroni on the anomalous genus *Rohdea*, which he prefers to place in the order Liliaceæ and tribe Asparageæ, rather than in the Araceæ. The minute structure of *Rohdea japonica* is described, and the mode of pollination, which appears to be effected partly by insects, but largely by snails, and even by spiders.

THE *Bulletino della Società Botanica Italiana*, Nos. 5–7, are largely occupied by papers chiefly interesting to Italian botanists. In addition, Sig. A. Baldacci has some observations on the sympodial branching in *Symphytum* and in other Borragineæ, and on the mode of branching in the Apocynaceæ, which appears to be also sympodial. Sig. U. Brizi enumerates the fossil Musci and Hepaticæ found in a locality within the Roman territory. Sig. C. Acqua describes the mode of formation of the wall in the growth of the pollen-tube of *Vinca major*, which presents a strong resemblance to that described by Buscalioni in the aerial hairs of *Lavatera.* Sig. C. Massalongo has several papers on galls.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 1.—"On the Colours of Sky Light, Sun Light, Cloud Light and Candle Light." By Captain W. de W. Abney, C.B., D.C.L., F.R.S., P.R.A.S.

The author has made several comparisons of the above lights throughout the different parts of their spectra, and has been able to verify their correctness by means of templates rotating in the spectrum of electric light, as described in Part II., "Colour Photometry," Phil. Trans., 1889. It seemed, however, that it would be useful if the colours of these lights could be expressed in single wave-lengths, together with the amount of added standard white light, the latter being expressed in terms of the luminosity of the dominant colour, in accordance with the method brought before the Royal Society in Proc. Roy. Soc., 1891.

When measuring light from the sky, a beam from the zenith or other desired part was reflected through a blackened tube into a darkened room in which the colour patch apparatus ("Colour Photometry," Abney and Festing, 1886) was placed, and the image of the end of the tube was focussed on to the front surface of a cube, the front surface of which was coated with zinc white, its background being black velvet. The patch of colour from the apparatus was also thrown on the cube. A rod placed in the paths of the two beams enabled the sky light and the spectrum colour to be examined side by side. The slit in the spectrum was an adjustable one so that any intensity of colour within limits would fall on the cube. A beam of white light reflected from the first surface of the first prism was again reflected from the surface of a thin prism on to the cube, a rod placed in its path cast a shadow on that part illuminated by the sky light, and by suitable adjustment the boundaries of the two shadows were caused to exactly coincide. The colour was thus diluted with white light, and rotating sectors, described in other papers, being placed in the path of the white beam, enabled the dilution to be regulated.

Sky Light.—On June 27, 1892, at 2.30 p.m., the sky was a good blue, but not a dark blue, and perhaps rather milky. The slit was moved into the part of the spectrum which appeared to be near the dominant colour. The colour was diluted to approximately the required amount. The slit was shifted and the dilution altered until the two colours made a perfect match. It was found that on the standard scale of the spectrum the dominant colour was represented by 28·6, which is λ 4800. The mean value of the sector aperture was 32°, and recollecting that the sectors are double sectors the comparison has to be made with 180°. The next operation was to compare the luminosity of the whole beam of white light with that of the colour. The sectors still remained in the white; the sky light was cut off, and the rod altered till the colour and the white were alongside each other with the boundaries of the shadows touching. The luminosities of the two were compared, and it was found that the aperture of the sector was 14°. As it required 32° of white to make the dilution of the colour, it follows that 32/14, or 2·286, parts of white were required to dilute 1 part of the blue. This may be expressed thus—

$$\text{Sky light} = \lambda\ 4800 + 2{\cdot}3\text{W}.$$

On July 4, 1892, at mid-day, the same procedure was adopted, and the dominant wave length was again λ 4800. In this case the amount of added white was thus—

$$\text{Sky light} = \lambda\ 4800 + 3{\cdot}1\text{W};$$

in other words, the sky was more milky.

At 4 p.m. on the same day the sky to the east, and about 30° above the horizon, was evidently slightly greener, and it was found that the colour agreed with scale No. 29·6 or λ 4834, and that it required three parts of white to be mixed with it.

$$\text{Sky light} = \lambda\ 4834 + 3\text{W}.$$

On other days, when the light of the portion of the sky near the zone of maximum polarisation the dominant wave length was found to be between these two limits, and was never found bluer, and the smallest admixture of white light was found to be 1·9.

From these measures it may be concluded that the dominant colour of a blue sky is λ 4800.

Amongst artists it is not uncommon to employ cobalt to render this colour, and in many instances this is mixed with Chinese white.

The dominant colour of cobalt was found to be at scale No. 29, or λ 4812, when illuminated by ordinary day light, whence it seems that, as far as colour is concerned, it is singularly fit for the purpose.

Sun light was compared in the same manner, but the beam was reflected from the surface of a prism into a dark room, and again diminished in intensity by placing in its path rotating sectors with very narrow apertures.

Near mid-day on July 8 the sun was very clear, the sky being free from clouds, and a strongish wind blowing from the west. Two separate sets of measures were made with an interval of an hour between each. It was found that the dominant colour was λ 4885 in both cases, and in the first set it was diluted with 5·45 of white, and in the other with 5·14 of white. This indicates that sun light contains slightly more green-blue rays than the light emitted from the crater of the positive pole of the electric light. This agrees with the spectrum measures made in "Colour Photometry."

Cloud light was next matched on days in which the sky was overcast. A comparison of the general light of the zenith was all that was attempted, and near mid-day.

It was found that it required 1 part of λ 4864 diluted with 5·5 parts of white to make a match. It will be seen that the dominant colour of cloud light lies between that of the sky and of the sun, as might be expected, and is decidedly whiter than the sky, as might also be anticipated.

Various comparisons of sunset colours have been made, and found to range from λ 6300 up to λ 4800; in some cases it was necessary to match by means of complementary colours.

The light from a paraffin candle it was found could be very closely matched with D sodium light. The equation may be expressed as follows:—

$$\text{Candle light} = \lambda\,5880 + 0{\cdot}4\text{W}.$$

The amount of added white varied from 0·1 to 0·5, and it is in this part of the spectrum that a large number of separate observations are required in order to get a good and fairly trustworthy mean.

June 15.—"Some of the Effects and Chemical Changes of Sugar injected into a Vein." By Vaughan Harley, M.D., Teacher of Chemical Pathology, University College, London, and Grocer Research Scholar. Communicated by George Harley, M.D., F.R.S.

When 10 grams of grape-sugar per kilo. of body-weight of a dog are injected into a vein and elimination by the kidneys prevented, the sugar so rapidly disappears from the circulating blood that it reached the normal quantity within six hours. The quantity of glycogen in the liver and muscles is not markedly increased.

The amount of lactic acid in the blood is increased to so marked a degree as in some cases to be more than the quantity of sugar. The greatest amount of lactic acid is found in the liver. Alcohol, acetose, and aceto-acetic acid are also present in the blood after the introduction of the sugar. There is no increase in the quantity of ammonia in the blood.

The introduction of the sugar causes marked disturbance of the nervous system, shown by the appearance of muscular spasms, hurried breathing, and finally coma. These are probably due to some of the products derived from the breaking down of the sugar molecules acting as a poison, which by further breaking up into other substances become harmless and the animals recover.

"Studies in the Morphology of Spore-producing Members. Part I. Equisetineæ and Lycopodineæ." By F. O. Bower, D.Sc., F.R.S., Regius Professor of Botany in the University of Glasgow.

The first pages are devoted to the discussion of points of general morphology of the sporophyte, as it is seen in archegoniate plants, together with a sketch of the history of opinion as to the morphological "dignity" of the sporangia, and their relation to the parts (usually sporophylls) which bear them. The position of Goebel is adopted, that sporangia are as much organs, *sui generis*, as are shoots, roots, &c., no matter where they may be seated.

It is customary to assume that the ontogeny will serve as a guide to the history of descent in plants as in animals. As applied in detail to the sporophyte generation this assumption cannot be upheld: for the conclusions drawn from wide comparison would be directly antagonistic to such a history. The young sporophyte of a fern first forms foliage leaves, stem, and roots; only after a considerable period are sporangia produced. On the recapitulation theory it would be concluded from this that the vegetative system was the first to appear, while sporangia were of subsequent origin, and it might further be held that sporophylls are metamorphosed foliage leaves. But the whole comparative study of the sporophyte of lower forms leads to the opposite conclusion; spore-production was the first office of the sporophyte, and if the lower Bryophyta really illustrate the mode of origin of the sporophyte, the production of spores preceded the existence of a vegetative system of the sporophyte, and has apparently been a constantly recurring event throughout evolution. It must therefore be concluded that the history of the ontogeny does not truly recapitulate the history of the descent as regards the neutral generation; the sporophyte is, in fact, an intercalated phase which has acquired vegetative characters. Comparative study of the Bryophyta leads to the conclusion that the whole vegetative region was the result of progressive sterilisation of potentially sporogenous tissues.

A brief review of the progress of this sterilisation as it has already been recognised among the Bryophyta is next given; it is pointed out that (*a*) the sterilisation may involve the whole thickness of the sporophyte, as in the formation of the seta, or (*b*) it may make itself apparent only in individual cells of the sporogonial head (elaters). But the Bryophyta are clearly marked from vascular plants by two characters: (1) the absence of appendicular organs; (2) the single continuous archesporium.

There are, at least, three possible ways in which plants with numerous separate archesporia may have originated from plants of some Bryophytic type: (1) by branching (chorisis) of a sporogonial head; (2) by formation of entirely new archesporia, having no direct connection by descent from pre-existent ones; (3) by partitioning of a continuous archesporium.

The frequent presence of synangia in eusporangiate Vascular Cryptogams suggests either coalescence accompanying reduction in a descending series, or partitioning by means of septa in an ascending series; the first question in connection with such synangia will be whether in any natural sequence of Vascular Cryptogams the progression from a non-septate to a septate condition can be traced; or the converse. Though the facts at hand do not amount to an actual demonstration, the Lycopodineæ and their allies are believed to be an ascending series, and they are seen to supply important evidence. *Phylloglossum*, *Lycopodium*, and *Selaginella*, *Lepidodendron*, and the Psilotaceæ show natural affinities. To this series *Isoetes* may be added.

As regards the sporangia, there can be no doubt of the homology of the sporangium of *Phylloglossum*, *Lycopodium*, *Selaginella*, and *Lepidodendron*. Within the genus *Lycopodium* differences of detail have been observed analogous to such differences as would result in the production of more bulky sporangia, such as those of *Lepidodendron* and *Isoetes*, though it is true these differences are not so extensive. In these very large sporangia trabeculæ are found, as rods or plates of sterile tissue, which may project far upwards into the sporangial cavity (*Lepidodendron*), or may extend the whole way through it to the upper wall (*Isoetes*). In the latter case it has been shown by Goebel that the trabeculæ are the result of differentiation of a potential archesporium, part of which is sterilised and forms the trabeculæ.

The next step is to the Psilotaceæ; and the first question is that of the real nature of the synangium in these plants. Sections both of *Psilotum* and *Tmesipteris*, show the synangium to originate below the apex of the sporangiophore, and from its upper surface, in a manner very similar to the sporangium of *Isoetes*. The form of the young synangium resembles that of the sporangium of *Lepidodendron*, with which genus also there is extraordinary anatomical similarity. The septum is similar in its origin to the sporogenous masses, and is not at first distinguishable from them; in this respect it also resembles *Isoetes*. It would thus appear that the whole synangium is comparable in origin and position, in the broad lines of development, and in function to the sporangia of other Lycopods, *that is, a septate comparable with a non-septate body*.

Tmesipteris appears to be a variable plant as regards the form and structure of its synangia; there is, however, some method in its irregularities; smaller synangia of simpler form and structure are found at the limits of its fertile zones, while about the middle of it synangia have been found with three loculi, corresponding to those of *Psilotum*. Examination of those of simpler form shows *that they may be only partially septate, or the septum may be absent from the first*. I have been able to prove in young synangia of this type that *the tissue which would normally form the septum may be sporogenous*; this is exactly the converse of what has been proved by Goebel in *Isoetes*, and the conclusion which may be drawn is that *there is no essential difference between the tissue which will form septum or trabeculæ and that which will form spores, since they can mutually undergo conversion.*

It has already been shown by others that in *Psilotum* the number of loculi in the synangium may vary, being sometimes two, normally three, but occasionally four or five. In *Tmesipteris* it may be one, two, or three; and as there is no doubt of the homology of these within the Psilotaceæ, we may conclude *that in homologous parts the loculi may vary in number from one upwards.*

We may recognise within the species *Tmesipteris* a correlation of size to number of loculi; the smallest specimens have no septum, and these are produced at the limits of the fertile zone, where nutrition may be failing; those which are of normal size have two loculi: occasionally, when of large size and well nourished, as at the middle of the fertile zone, the loculi may be three. Here is illustrated in one species much the same sequence as is seen elsewhere for distinct genera, such as *Lycopodium*, *Isoetes*, *Lepidodendron*: where the sporangium is small there are neither trabeculæ nor septa, the exigencies of nutrition, and perhaps also of mechanical strengthening, not being felt (*Lycopodium*): where the sporangium is large sterile bands of tissue are present; these appear as trabeculæ or incomplete septa *Lepidodendron* or *Isoetes*, but as complete septa in the large synangia of *Tmesipteris*. To those who accept the homology of the synangium of *Tmesipteris* with the sporangium of other Lycopodinæ the probability of this will appear specially strong. Such facts as these and their theoretical bearing are discussed at length in the memoir: the opinion is finally expressed that progressive sterilisation and formation of septa are factors which will have to be taken into account in solving the problems of origin of vascular plants.

"Magnetic Qualities of Iron," by J. A. Ewing, M.A., F.R.S., Professor of Mechanism and Applied Mechanics in the University of Cambridge, and Miss Helen G. Klaassen, Lecturer in Physics, Newnham College.

The paper describes a series of observations of magnetic quality in various specimens of sheet iron and iron wire. A principal object was to determine the amount of energy lost in consequence of magnetic hysteresis when the iron under examination was carried through cyclic magnetising processes. Many cycles of B and H were gone through in the case of each of the specimens, the limits between which B was reversed being varied step by step in successive cycles, to allow the relation of the energy expended or of $\int \mathrm{H}\,d\mathrm{I}$ to B to be determined. The iron examined was, for the most part, thin sheet metal or wire such as is used in the construction of transformer cores. The experiments show that there are marked differences in the values of $\int \mathrm{H}\,d\mathrm{I}$ in different specimens, even when all are nominally soft iron.

In connection with these results a formula proposed by Mr. C. P. Steinmetz $\left(\int \mathrm{H}\,d\mathrm{I} = c\mathrm{B}^{1\cdot6}\right)$[1] to express the relation of the hysteresis losses to B is discussed, and it is shown that although such a formula may serve fairly well as an approximate statement of the relation within those limits of B which are important in practice, it fails when applied to the more extreme portions of the curve.

The authors go on to describe a second group of experiments, in which direct measurements were made of the heat developed in magnetic reversals. The method consisted in using two rings, alike in all respects, with divided magnetising coils. One ring had its coils coupled so that the two parts opposed each other, and the core was consequently not magnetised when a current passed. The other ring was active, and its coils (coupled inductively) were connected in series with the non-inductive coils of the inactive ring. Alternating currents were passed through both, and the active ring became heated by the effects of hysteresis and Foucault currents. To balance this a steady current was caused to flow in the core of the inactive ring, and the energy was measured which had to be expended in this current in order that the temperature of the two rings might continue equal. In some cases the rings used were miniature transformers, and no difference was found in the amount of energy consumed in the core when the "load" was taken off or put on the secondary.

In a third group of experiments the magnetic curve tracer was used to examine certain features of the curves of magnetisation. This instrument, invented by one of the authors, draws curves which exhibit the relation of the magnetisation of given samples of iron or steel to the magnetising current. Amongst other points referred to in this connection is the time-lag in magnetisation, which is shown by the curve-tracer to be immensely great in soft thick bars. The work spent per cycle is a maximum at a particular frequency, which in such bars is very low.

The fourth and last section of the paper relates to the molecular theory of magnetisation, and describes experiments made with groups of small pivoted magnets. Results are given which tend to confirm the theory.

The particulars of the observations are set out in about forty sheets of curves which accompany the paper.

SYDNEY.

Royal Society of New South Wales, May 3.—Annual Meeting.—Prof. Warren, President, in the chair.—The report stated that thirty-three new members had been elected during the year, and the total number on the roll on April 30 was 477. During the year the Society held eight meetings, at which the following papers were read:—Presidential address, Hailstorms, and is Mars inhabited? by H. C. Russell, F.R.S.—On the importance and nature of the Oceanic languages, by Sidney H. Ray.—On certain geometrical operations, Part I., by G. Fleuri.—A determination of the magnetic elements at the Physical Laboratory, University of Sydney, by C. Coleridge Farr.—Analyses of some of the well, spring, mineral, and artesian waters of New South Wales, and their probable value for irrigation and other purposes, by John C. H. Mingaye.—Ventilation of sewers and drains, by John M. Smail.—Flying-machine work and the ⅙ I.H.P. steam motor weighing 3¼lbs., by Lawrence Hargrave.—The venom of the Australian black snake (*Pseudechis porphyriacus*), by Dr. C. J. Martin and J. McGarvie Smith.—On the effect which settlement in Australia has produced upon indigenous vegetation, by Alex. G. Hamilton (for which essay the Society's bronze medal and prize of £25 were awarded).—Some folk-songs and myths from Samoa, translated by the Rev. G. Pratt, with introductions and notes by Dr. John Fraser.—Preliminary note on limestone occurring near Sydney, by Henry G. Smith.—Observations on shell-heaps and shell-beds, significance and importance of the record they afford, by E. J. Statham.—Notes on the recent cholera epidemic in Germany, by Dr. Schwarzbach.—On native copper iodide (Marshite) and other minerals from Broken Hill, New South Wales, by C. W. Marsh.—On the comet in the constellation Andromeda.—Results of observations of Wolf's Comet (II.), 1891, Swift's Comet (I.), 1892, and Winnecke's Periodical Comet, 1892, at Windsor, New South Wales, by John Tebbutt.—On the languages of Oceania, by Dr. John Fraser.—Notes on some Australian stone weapons, by Prof. Liversidge, F.R.S. The following papers were read before the various sections, viz.:—Medical Section: Recent work on the pathology of cancer, by Dr. G. E. Rennie.—Notes of a case of hydatid of the brain, by Dr. W. Chisholm.—Notes on a case of sarcoma of the testis in a cryptorchid removal, by Dr. Fiaschi. Engineering Section: Description of the engines recently erected at Ryde Pumping Station, with results of the tests applied, by C. W. Darley.—Various systems of tramway traction, by W. F. How.—Recent bridge-building in New Zealand, by A. H. Alabaster.—Notes on the economical use of steam, by T. H. Houghton.—Light railways for New South Wales, by C. O. Burge. Chemical and Geological Section: An account of a visit to New Guinea, together with some notes on the community of life between Australia and New Zealand, by Charles Hedley.—On the occurrence of platinum and associated minerals in the sands of the Richmond river; also in the lode material of Broken Hill, by J. C. H. Mingaye.—On a remarkable specimen of auriferous quartz containing fossil encrinites.—An account of some intrusive rocks in the neighbourhood of Sydney, by Rev. J. Milne Curran.—On a new mineral containing iodide of copper found at Broken Hill, by W. M. Hamlet.—The Clarke medal for 1893 had been awarded to Prof. Ralph Tate, University, Adelaide. The Council had issued the following list of subjects, with the offer of the Society's bronze medal and a prize of £25 for each of the best researches, if of sufficient merit, to be sent in not later than May 1, 1894:—On the timbers of New South Wales, with special reference to their fitness for use in construction, manufactures, and other similar purposes.—On the raised sea-beaches and kitchen middens on the coast of New South Wales.—On the aboriginal rock-carvings and paintings in New South Wales. To be sent in not later than May 1, 1895: On the silver ore deposits of New South Wales.—On the physiological action of the poison of any Australian snake, spider, or tick.—On the chemistry of the Australian gums and resins. The chairman read the Presidential address, and the officers and council were elected for the ensuing year, Prof. T. P. Anderson Stuart being President.

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[1] "Trans. American Inst. of Electrical Engineers," vol. ix. No. 1.

PARIS.

Academy of Sciences, July 24.—M. de Lacaze-Duthiers in the chair.—Diverse considerations on the theory of luminous waves, by M. J. Boussinesq.—Researches on samarium, by M. Lecoq de Boisbandran.—On the alleged fossil ferns of the coarse Parisian limestone, by M. Ed. Bureau.—On the distribution of the intensity of gravitation on the surface of the globe, by M. Defforges. This memoir has been submitted to the judgment of the Academy by the Minister of War. It contains a summary of the observations of the value of g at thirty-five stations, twenty-six determinations having been made with the "reversible invertible" pendulum invented by Commander Defforges, which eliminates the error due to the sliding of the knife edges. In this pendulum a displacement of the centre of gravity takes the place of the interchange of knife-edges, and the influence of curvature and of any dissymmetry in the action of the air is avoided. In the list of values enumerated, extending from Spitzbergen to Scotland, England, France, Corsica, and Algiers, there are certain anomalies which cannot be explained by supposed inaccuracies of observation and reduction. Clairaut's law, true in general, is almost everywhere masked by these anomalies. On the littorals of the various seas, gravitation presents slight anomalies, which are constant on the same coast, and characteristic of it. The islands show a considerable excess of gravitational force. On the continents the reverse obtains, and the defect appears to grow with the altitude and the distance from the sea. As the real surface of the ellipsoid, according to Clarke, does not depart from the theoretical surface by more than 18·4 feet from the Shetlands to the Mediterranean, the discrepancies cannot be attributed to irregularities in the figure of the earth, but must probably be accounted for on geological grounds.—Observations of Rordame's comet, made with the *equatorial coudé* (0.32m.) of the Algiers observatory, by M. Rambaud.—On the equations of the second degree whose general integral is uniform, by M. Paul Painlevé.—On certain systems of ordinary differential equations, by M. A. Guldberg.—On a nomographic method applicable to equations which may contain up to ten variables, by M. Maurice d'Ocagne.—Density of sulphurous anhydride, its compressibility and expansion in the proximity of normal conditions, by M. A. Leduc. The density of sulphurous acid under normal conditions was found to lie between 2·2638 and 2·2641. The coefficient of expansion between 0° and 20° was, at normal pressure, 0·003963, and at a pressure of 334mm., 0·003787.—On residues of polarisation, by M. E. Bouty. For defining capacities of polarisation it is implicitly admitted that, at least to a first approximation, the whole quantity of electricity which traverses the voltameter circuit during charge is employed in establishing polarisation, and will be recovered during discharge; also that to a given polarisation there corresponds a single and unique value of recoverable charge. M. Bouty shows that the effective capacities of discharge increase in proportion as the polarisation of the voltameter decreases. Even the initial capacities of polarisation cannot be relied upon to give rigidly constant values.—On some new interference fringes which are strictly achromatic, by M. Georges Meslin.—On the oxidation of sulphide of nickel, by M. Ph. de Clermont.—On crystallised cuprous phosphide, by M. A. Granger.—On bismuth subgallate (dermatol), by M. H. Causse.—On the condensation of the alcohols of the fatty series with the aromatic carburets, by MM. A. Brochet and P. le Boulenger.—On the effects of the slow destruction of the pancreas, by M. E. Hédon.—On the interference of excitations in the nerve, by M. N. Wedensky.—Comparison between the anterior and posterior members of some Urodelæ, by M. A. Perrin.—A parasitic entomophagus of the European silk-worm, by M. E. L. Bouvier and G. Delacroix.—Further researches on coccidia, by M. P. Thélohan.—On certain facts which permit a comparison between the central nervous systems of the Lamellibranchiata and the Gasteropoda, by M. A. d'Hardiviller.—On the Rhizoctone of Lucerne, by M. A. Prunet.—On the glacial origin of the breccia of the coal-bearing basins of Central France, by M. A. Julien.—On two Turkish meteorites recently added to the Natural History Museum, by M. Stanislas Meunier.—Desert sands of Lower Egypt, by M. A. Andouard. An analysis of the sands between the Ismailia canal and the Menzaleh Lake showed them to consist of 96·5 per cent. silica, 0·384 water, 0.507 organic matter, and small quantities of other substances such as carbonic acid, alumina, lime, and ferrous oxide. These deserts are gradually being reclaimed by irrigation and by the use of the "black earth" gathered among the ruins of ancient habitations.

GÖTTINGEN.

Royal Society of Sciences, February 22.—H. Weber: Researches in the theory of numbers in the domain of elliptic functions, II. A. Hurwitz: Proof of the transcendency of the number e. H. Burkhardt: On vector-functions which are themselves vectors, an application of invariantal methods to a question of mathematical physics. W. Holtz: On the immediate perception of magnitude in its relation to distance and contrast. W. Ramsay: The isomorphic stratification and the intensity of double refraction in epidote.

March 22.—W. Voigt: Determination of the constants of thermal dilatation and pressure for certain quasi-isotropic metals.

April 12.—O. Wallach: New observations on compounds of the camphor series. W. Voigt: The specific heats c_p and c_v of certain quasi-isotropic metals; determination of the elastic constants of chloride of sodium; remarks on the problem of the transverse vibrations of rectangular plates.

CONTENTS.

PAGE
A Catalogue of Snakes. By **W. T. Blanford, F.R.S.** 313
An Alpine Guide. By **T. G. B.** 314
Our Book Shelf:—
  Haeder: "A Handbook on the Steam-Engine."—**N. J. Lockyer** 314
  Wright "Heat" 315
Letters to the Editor:—
  Slickensides. (*With Diagram.*)—**J. Allen Howe** 315
  Potstones found near Seaford.—**Geo. Abbott** 315
  Simplified Multiplication.—**Lieut.-Colonel Allan Cunningham, R.E.** 316
  Thunderstorm Phenomena on the Matterhorn.—**Walter Larden** 316
  Highest Rainfall in Twenty-four Hours.—**E. Douglas Archibald** 317
  Vivisection.—**Cecil Carus-Wilson** 317
  A Correction.—**J. J. Walker, F.R.S.** 317
The Astronomical History of On and Thebes. By **J. Norman Lockyer, F.R.S.** 318
A Periodic Mercury Pump. (*With Diagram.*) By **Rev. Frederick J. Smith** 320
The Late Dr. John Rae 321
Notes 321
Our Astronomical Column:—
  Meteor Showers 326
  Comet Finlay 1893 326
  Rordame-Quénesset Comet, 1893 326
  Earth Movements 326
  Observations made during the Eclipse of April, 1893 326
  The Observatory of Yale University 327
  "Astronomischen Gesellschaft" 327
Geographical Notes 327
Celebration of the Rothamsted Jubilee 327
The Geologists' Association in Ireland 329
The Development of *Echinocyamus pusillus* 330
France and International Time 330
Oligodynamic Phenomena of Living Cells. By **A. W. B.** 331
University and Educational Intelligence 331
Scientific Serials 332
Societies and Academies 333